

**Colorado River Storage Project  
Flaming Gorge Working Group  
Meeting Minutes  
August 21, 2013**

### **Participation**

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This meeting was held at the Utah Division of Wildlife Resources, Vernal, Utah. Attendees are listed below.

### **Purpose of Meeting**

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The purpose of these meetings (held in April and August) is to inform the public and other interested parties of Reclamation's current and future operational plans and to gather information from the public regarding specific resources associated with Flaming Gorge Reservoir and the river corridor below it. In addition, the meetings are used to coordinate activities and exchange information among agencies, water users, and other interested parties concerning the Green River.

### **General**

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Heather Patno called the meeting to order at 11:00 a.m. with 19 present in person and several participating via the online conference Webinar (see signup sheet for attendance). Presentations were given in the following order: Heather Patno for Ashley Nielson of the National Weather Service Colorado River Forecast Center (CBRFC); Heather Patno, Bureau of Reclamation and Dave Speas, Bureau of Reclamation. Before starting, all present introduced themselves and their affiliations.

### **Forecast Presentation - Heather Patno for Ashley Nielson**

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Heather Patno stepped in for Ashley Nielson of the Colorado River Basin Forecast Center in Salt Lake City and provided a review of 2013 precipitation, temperature, snow pack, and streamflow conditions. She also characterized the April-July water supply forecast performance, and briefly discussed preliminary water supply and climate forecasts for WY 2014.

#### Precipitation:

October, December, April and July monthly precipitation were above average. All other months had much below average precipitation. As a result, seasonal precipitation from October 2012 through July 2013 was below average, and amounted to only 70 to 90 percent of normal over the basin as a whole.

#### Temperature:

In contrast to the warm spring observed in 2012, March and April temperatures in 2013 were below normal. May temperatures were very close to normal. Despite being relatively cool, both April and May featured several consecutive days with above normal temperatures. In June, temperatures were well above normal.

#### Snowpack:

Snow water equivalent (SWE) in the Upper Green was 75 percent of the median peak on April 6th (median peak date). In contrast to the spring of 2012, SWE continued to increase through

April as a result of above normal precipitation and below normal temperatures. Observed snowpack peaked on April 24th at 94 percent of the median peak. Runoff primarily occurred during May, and observed snow water equivalent was reduced to zero during the first week of June.

Conditions were similar in the Yampa River Basin above Deerlodge, where SWE was 74 percent of median peak on April 10th (median peak date). Observed snowpack peaked on April 25th at 91 percent of the median peak.

#### Streamflow:

Streamflows in the Green River near La Barge were “normal” (25th-75th percentile class) in May, but were reduced to “much below normal” (lowest 5th percentile) from June through August.

On the Yampa River near Maybell, streamflows were in the normal range from April through June, but declined to “below normal” (10th-24th percentile class) values in July and August. The Yamp River peaked May 19th at 9,690 cfs. The observed peak was more than 20% greater than the April 16th forecasted peak of 8,000 cfs.

#### Water Supply Forecast Performance:

In the Upper Green River, the April 1st most probable (50% exceedance probability) runoff forecast was 490,000 acre-feet (AF) which is 50% of average. In the April 16 mid-month forecast update, the most probable forecast increased to 530,000 AF (54% of average) due to above average precipitation in April. However, the final (May) Flaming Gorge April-July water supply forecast was reduced to 480,000 AF (49% of average). Subsequent weeks were warm and dry, such that the actual water supply inflow to Flaming Gorge from April through July was 361,000 AF (37% of average), and fell near the lowest end of the forecasted range. WY 2013 ranked as the 4th driest year on record at Flaming Gorge, behind only 1977, 2002, and 1992.

The April 1st Yampa River at Maybell most probable forecast was 495,000 AF (53% of average) and the April 16th most probable forecast was 565,000 AF (60% of average). In contrast to the Upper Green River, the observed water supply volume in the the Yampa near Maybell was 574,000 AF (61% of average) and was consistent with the final (May) forecast of 605,000 AF (65% of average), and actually exceeded the April 1st and April 16th most probable forecasts. The total Yampa River runoff forecast is a combination of the Little Snake River near Lily, CO and the Yampa-River near Maybell, CO forecasts. The final (May) Yampa River basin forecast was 778,000 AF or (67% of average). The observed water supply volume for the Yampa River (Maybell + Lily) was 687,000 AF (54% of average).

The CBRFC plans to review the model features in an effort to improve forecasted Green River water supply.

#### Weather and Climate Forecasts

ENSO conditions are currently neutral and are forecast to remain neutral in WY 2014. Long range climate forecasts continue to show increased chances for above normal temperatures and equal chances of below or above normal precipitation through early 2014.

Forecasted fall inflows to Flaming Gorge are below average, ranging from 34% of average in August (30,000 AF) to 48% of average in October (28,000 AF). Forecasted streamflows in the Yampa River near Maybell are 57% (14,000 AF), 65% (15,000 AF), and 64% (12,000 AF) of average in October, November, and December, respectively.

### **Hydrology and Operations - Heather Patno**

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Heather Patno first provided an overview of the *2006 Record of Decision Operation Criteria* and the 2013 Adaptive Management Operating Criteria, which dictate the operation of Flaming Gorge Reservoir. She then reviewed WY 2013 operations, discussed current reservoir conditions, and described anticipated operations for WY 2014.

Flaming Gorge operations are dependent on conditions in three reaches, defined as follows: Reach 1 consists of the Green River from Flaming Gorge Dam to the Yampa River Confluence; Reach 2 covers the Green River from the Yampa River Confluence to the Duchesne River Confluence; and Reach 3 includes the Green River from the Duchesne River Confluence to the Colorado River Confluence.

The final (May) Flaming Gorge April-July water supply forecast was 480,000 AF (49% of average), which resulted in a “moderately dry” hydrologic classification and reservoir operations were determined accordingly. However, the observed April-July water supply volume was only 361,000 AF (37% average), making WY 2013 the 4th driest year on record. Because this volume falls within the lowest 10th percentile range (i.e. 90% exceedance probability), WY 2013 is hydrologically classified as “dry”. Given forecasted inflows for the remainder of August and September, unregulated inflows for WY 2013 are projected at 42% of the annual average. This is significantly lower than the WY 2012 unregulated inflow volume, which amounted to 68% of the annual average.

The final (May) Yampa River basin forecast was 778,000 AF or (67% of average). The observed water supply volume for the Yampa River (Maybell + Lily) was 687,000 AF (54% of average). Both the forecast and observed inflow volume fall within the “moderately dry” (70-90% exceedance probability) hydrologic classification.

In 2013, the U.S. Fish and Wildlife Service requested that base flow targets be augmented by as much as 40% in order to comply with the 2006 ROD and 2005 biological opinion (BO). In addition, the Upper Colorado River Endangered Fish Recovery Program requested releases to support the 2013 Larval Trigger Study Program. The goal of the 2013 LTSP was to entrain larval razorback sucker in Stewart Lake wetland by coordinating releases with a biological trigger (i.e. the presence of fish larvae) rather than a hydrologic trigger (i.e. Yampa River peaks), as was done in the past. (LTSP operations were discussed further by Dave Speas in a subsequent presentation.) Reclamation committed to make releases necessary to meet the goals of the ROD and the LTSP by augmenting Yampa River flows with the minimum required Flaming Gorge releases, including bypass releases, if necessary. Given the “moderately dry” hydrologic classification, a flow target of 8,300 cfs (or more) in the Green River at Jensen, UT for a period of 7-14 days was established. Coordinated operations allowed this target to be met, as flows at Jensen exceeded 8,300 cfs for a total of 25 days, 18 of which coincided with the presence of razorback sucker larvae.

Flaming Gorge reservoir is currently 76% full with 904,000 acre-feet of available space. Reservoir elevation on August 19th was 6,016.23 feet, correlating to 23.77 feet below the maximum reservoir elevation of 6,040 feet. Average inflow is 700 cfs and average release is 1,100 cfs. Throughout the Upper Colorado River Drainage Basin, April through July reservoir inflows were well below the average seasonal inflow volume. As a percent of average, inflow to Flaming Gorge reservoir was among the lowest of the major reservoirs (Fontenelle, Blue Mesa, Navajo, and Glen Canyon). Nevertheless, Flaming Gorge currently has the most storage (in terms of percent full) in the system, with the exception of the relatively small Morrow Point Reservoir.

The current inflow forecast for the month of August is 27,000 AF, which is only 30% of the 30-year average (89,000 AF). Releases are currently 1,100 cfs, and are expected to remain at this level through September 30, 2013. The minimum reservoir elevation is expected to reach 6,014 in October, and the reservoir will remain close to that level through the winter.

Operational flexibility exists in Flaming Gorge releases and corresponding Green River base flows. From August through November, mean daily flow should be within 40% of the mean annual base flow. From December through February, mean daily flow should be within 25% of the mean annual base flow. The rate of change in mean daily flow from day to day should not exceed 3%, which is implemented as 50 cfs/day. Fluctuation from hydropower between maximum and minimum daily flows should produce no more than a 0.1-meter change in stage at the USGS stream gage near Jensen, UT. Given the 40% augmentation requested by the Fish and Wildlife Service, Reach 1 base flows (downstream end at confluence of Green River and Yampa River) can range from 800 cfs to 1400 cfs in a dry year. Similarly, Reach 2 baseflows (as measured in the Green River at Jensen, UT) can range from 900 cfs to 1540 cfs in a dry year. Current streamflows in the Yampa River at Deerlodge Park are close to 150 cfs, while flows in the Green River near Jensen are just below 1500 cfs.

The WY 2014 Flaming Gorge unregulated inflow most probable forecast is for 1,090,000 AF (75% of average), with a range of 705,000 AF (48% of average) to 2,270,000 AF (156% of average). The most probable April-July release forecast is for 750,000 AF (77% of average), with a range of 402,000 AF (41% of average) to 1,704,000 AF (174% of average). It is anticipated that Flaming Gorge releases will be reduced from 1,100 cfs to 820 cfs in October 2013, and will likely remain at that level until Spring 2014. In both the minimum and most probable scenarios, releases will briefly peak in late May 2014, before returning to a base flow release of 820-1,000 cfs for the remainder of the year. Reservoir elevation targets are determined by forecasted inflows. For 2014, the most probable and maximum probable forecasts result in similar elevation targets, while the minimum probable forecast results in much lower elevation targets. Projected Flaming Gorge maximum reservoir elevation under the most probable hydrologic condition for WY 2014 is 6,020.94 feet in September 2014.

### **Larval Trigger Study Plan- Dave Speas**

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Dave Speas discussed the activities and outcome of the 2013 Larval Trigger Study Plan (LTSP). The LTSP was implemented as part of the Upper Colorado River Endangered Fish Recovery Program Spring Flow Request. The goal of the Recovery Program is to recover

endangered fishes while water development proceeds in compliance with applicable Federal and State laws. It balances the Endangered Species Act with the Law of the River.

Spring operations at Flaming Gorge provide specific benefit to early life stages of razorback sucker, which were nearly extinct in the 1990's. Razorback Sucker spawn in the spring below Dinosaur National Park and Split mountain (Reach 2), and larvae drift into the Jensen/Ouray valley where they become entrained in off-channel floodplain wetlands. Peak flows connect the floodplain, which provides important nursery habitat for larval razorback sucker. The Yampa River is largely unregulated and provides most of the spring peak.

Historically, study emphasis has been on hydrologic triggers such as levee elevation and peak flows in the Yampa River, rather than on the timing of larval drift (i.e. biological triggers). However, a key finding was that, with the exception of high water years (1999, 2011), mismatched drift and peak flows were the rule from 1992 to present. While the flows from Flaming Gorge Dam certainly worked to provide access of larvae to floodplain wetlands, emergence and drift of larvae usually occurred as the hydrograph was in decline, providing the fish with limited access to wetlands.

In 2013, the objective of the LTSP was to time Flaming Gorge releases with the presence of wild-produced razorback sucker larvae in order to entrain the larvae in wetlands. Proposed study sites included Stewart Lake (flow-through wetland), Above Brennan (flow-through wetland), and Old Charley Wash (single-break wetland). Only Stewart Lake was evaluated during the 2013 study. A similar study at Stewart Lake was attempted in 2012, but was not successful due to arid conditions.

In early May, the hydrologic classification for the Green and Yampa River basins was determined to be "moderately dry." As a result, flows at Jensen, UT were required to exceed 8,300 cfs for 7-14 days during larval drift. On May 27th, USFWS detected larval razorback suckers in multiple wetland habitats, and on May 29th, UDWR opened the outlet gates to Stewart Lake, which entrained large numbers of razorback sucker larvae.

On May 30th, Flaming Gorge Dam discharge was raised to powerplant capacity (4,600 cfs), with the option to add bypass flows if Yampa River flows declined below 4,000 cfs. On June 2nd, declining flows prompted closure of the Stewart Lake gates to conserve water and larvae already entrained. On June 3rd, flow in the Yampa River declined to 3,360 cfs. As a result, Reclamation announced its decision to release bypass flows in order to maintain flows at or above 8,300 cfs. On June 4th, Flaming Gorge Dam releases increased to 5,500 cfs for one and a half days. On June 6th, Stewart Lake gates were re-opened for 12 hours in order to receive the second pulse of water (slightly higher than the first) from the combined Yampa and Green River flows, including the Flaming Gorge bypass flows. On August 8th, dwindling water supplies prompted UDWR to drain Stewart Lake and release the entrained razorback suckers back into the Green River.

LTSP operations resulted in a total of 18 days in which the flow at Jensen, UT was above 8,300 cfs during larval drift. After spending just under 2 months in Stewart Lake, and doubling to tripling in size, over 600 wild-spawned razorback sucker were returned to the Green River. Roughly 145 fish were found dead in Stewart Lake, indicating an 81% recovery rate. The successful entrainment of larvae in Stewart Lake was largely due to thorough monitoring and

excellent real-time coordination between USFWS, UDWR, and BOR in response to larval presence and varying streamflows.

### Discussion and Next Meeting

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The question was asked to whether or not ENSO (El Nino/La Nina) signals are considered in the forecasted hydrology. The forecast method is based on an ensemble of streamflow projections informed by 30 years of past climate data. The forecasts don't explicitly consider ENSO signals because there are too few years with a clear signal to incorporate.

Recovery Program personnel were asked what their request would be in the event that 2014 is a "dry" year. U.S. Fish and Wildlife Service responded by saying that they would likely request similar flow targets (as in 2013) in order to achieve the study requirement of 3 years under dry conditions (<18,600 cfs) and 3 years under wet conditions (>18,600 cfs).

The Recovery Program was asked why the LTSP was not successful in 2012, and what is the mortality rate of juvenile fish released back into the Green River. Despite successful entrainment in Stewart Lake, the lack of success in 2012 was due to Stewart Lake drying up before the razorback sucker could grow and be released in the Green River. Razorback sucker mortality rates are high in the first two years. It was suggested that 10% of those released in the river may survive the first year, while 20-30% of those will survive the second year.

The manager at Lucerne Marina expressed concern about the low reservoir elevation and the impact it has on public safety at the resort. The ramps have to be moved during low reservoir elevation and it is very expensive to move them. In particular, concern was expressed that supplemental flows were made for the LTSP in addition to increased base flows of 1,100 cfs (rather than 800 cfs) during a "dry" year. This seems contrary to efforts to conserve water under dry conditions. Reclamation pointed out that operations were based on a "moderately dry" hydrologic classification, and that the difference between forecast and observed were unexpected. LTSP releases had been approved and began at the end of May and continued through June. In addition, supplemental base flow requests are made to protect critical habitat of endangered fish species (particularly the pike minnow), as required by the 2005 BO and 2006 ROD. The base flow request is independent of the LTSP peak flow request (for razorback sucker) from the Recovery Program, and the two have different drivers. However, both requests must be reviewed and approved by Reclamation management.

It was also asked if there are alternative operations that could have avoided bypass releases and still met the goals of the Recovery Program. It's estimated that the difference between releasing base flows of 1,100 cfs rather than 800 cfs for the summer reduced reservoir storage by 63,000 AF and lowered the lake elevation by 2 feet. The volume reduction related to bypass was estimated at 3,000 AF, and is considered relatively small compared to the impact of the increased base flows. Also consider that the bypassed flows are received by Lake Powell, which is only 45% full. In 2014, Lake Powell releases will be reduced to 7.48 million acre-feet, and Western Power is expecting to purchase power. National Park Service staff noted that Lake Mead superintendent has stated that there will be no recreation on the lake in 2015 unless conditions improve drastically. In general, conditions are worse elsewhere.

Marina staff pointed out that while they support fish recovery efforts, they also support conservation and 3 feet is significant in terms of the amount of effort to maintain boat docks, especially during a relatively hot summer that has resulted in increased visitation.

Recovery Program staff noted that it's a difficult time to be a fish—flows are severely reduced on several rivers, habitat access is limited, and competition for resources amongst each other and with non-native fish in the mainstem Green River is high.

### **Next Meeting**

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The next meeting of the Flaming Gorge Working Group was set for 11:00 am on Thursday, April 24, 2014, at the new Utah Department of Natural Resources building in Vernal, Utah, located at 318 North Vernal Avenue.

### **Presentations**

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#### [Colorado Basin River Forecast Center - Forecast Presentation](http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/fg.wgmt.0821.2013.pdf)

<http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/fg.wgmt.0821.2013.pdf>

#### [Recovery Program - Larval Trigger Study Plan](http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/FG%20work%20group%20Aug%2021%202013.pdf)

<http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/FG work group Aug 21 2013.pdf>

#### [Reclamation - Hydrology and Operations](http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/FlamingGorgeWorkGroup_Aug13.pdf)

[http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/FlamingGorgeWorkGroup\\_Aug13.pdf](http://www.usbr.gov/uc/water/crsp/wg/fg/pdfs/FlamingGorgeWorkGroup_Aug13.pdf)



## Attendees

Name	Representing
Heather Patno	Reclamation
Beverley Heffernan	Reclamation
John Morton	Reclamation
Dave Speas	Reclamation
Rick Clayton	Reclamation
Lee Traynham	Reclamation
Jerry Wilhite	Western Area Power Administration
Nancy Scheid	Western Area Power Administration
Tom Chart	U.S. Fish & Wildlife Service
Kevin McAbee	U.S. Fish & Wildlife Service
Trina Hedrick	Utah Division Wildlife Resources
Joe Skorupski	Utah Division Wildlife Resources
Matt Breen	Utah Division Wildlife Resources
Ryan Mosley	Utah Division Wildlife Resources
Doug Burton	Green River Outfitter Guides Association
Doug Burton	Green River Outfitter Guides Association
Tamara Naumann	National Park Service - Dinosaur
Mary Risser	National Park Service - Dinosaur
John Shields	Wyoming State Engineer's Office
Bob Leake	Utah Division of Wildlife Resources
Gawain Snow	Uintah Water Conservancy District
Jerry Taylor	Lucerne Marina

## Additional Links

### [Flaming Gorge Technical Working Group Meeting Summaries](http://www.usbr.gov/uc/water/crsp/wg/fg/twg/twgSummaries.html)

<http://www.usbr.gov/uc/water/crsp/wg/fg/twg/twgSummaries.html>

## Previous Meeting Minutes

Flaming Gorge Working Group Meeting Minutes:

August 21, 2013

April 24, 2013

August 22, 2012

April 18, 2012

August 23, 2011

April 26, 2011

August 26, 2010

April 27, 2010



August 26, 2009  
April 15, 2009  
August 20, 2008  
April 16, 2008  
August 23, 2007  
April 19, 2007  
August 22, 2006  
April 13, 2006  
November 2, 2005  
October 28, 2005  
August 25, 2005  
April 20, 2005  
August 19, 2004  
April 15, 2004